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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/071,405	02/08/2002	Frans Andreas Gerritsen	NL010106	1656

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EXAMINER
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TUCKER, WESLEY J

ART UNIT	PAPER NUMBER
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2624

MAIL DATE	DELIVERY MODE
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04/14/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/071,405	<b>Applicant(s)</b> GERRITSEN ET AL.	
	<b>Examiner</b> WESLEY TUCKER	<b>Art Unit</b> 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 and 4-9 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 4-9 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 08 February 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)                     | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

1. Applicant's amendment filed January 29<sup>th</sup> 2008 has been entered and made of record.

2. Applicant has amended claims 1, 4, 7 and 8. Claims 2-3 have been cancelled. Claims 1 and 4-9 are pending.

3. Applicant's arguments in view of the newly presented amendments have been fully considered, but are not found persuasive for at least the following reasons:

Applicant argues that the cited reference to Pieper does not disclose the amended features of **segmenting a region of interest from the one or more relevant images is performed in one or more of the individual images, wherein the segmenting is performed on the basis of information in the reconstructed slice along the cut plane through the multi-dimensional data set (column 17, lines 15-35).**

**Locating an edge in the reconstructed slice, wherein the segmenting in the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant (image).**

Examiner disagrees and submits that Pieper does exactly what is claimed. The whole purpose of the invention of Pieper is to create reconstructed image slices in a direction different from the sampled image slices (column 14, lines 25-37). Pieper teaches that images are generated or reconstructed using data from slice images in a different direction through well know techniques known in the art. These techniques

most likely use interpolation for recreating an image from a series of slice images. It is also a primary object of Pieper's invention to identify anatomical structures or regions of interest in both multiple interesting slices and in the 3D model image data (column 14, lines 56-67 and column 15, lines 22-63). Pieper teaches that markers are used in the image and the location of the marker is known in the other corresponding 2D slices and the 3D model image which are all simultaneously displayed to the user or physician. Furthermore when an object or anatomical structure or region of interest is identified in one 2D slice, it is identified in the other corresponding 2D slices, which have been reconstructed or generated (column 15, lines 48-63). Therefore Pieper teaches a comprehensive system of 3D modeling with both sampled reconstructed 2D slices to identify regions of interest such as anatomical structures, markers, blood vessels or any other object. It should be noted that edges are inherently identified when the anatomical structure or object of interest is identified in the corresponding 2D slices. There can be no object of interest or anatomical structure without the known location of identified edges which define such a structure. Therefore the rejection in view of Pieper is maintained and is accordingly made FINAL.

### ***Specification Objection***

#### **Summary of Argument:**

The specification was previously objected to because it lacks headings for:

- Background of the Invention
- Summary
- Brief Description
- Detailed Description

Further, the specification was objected to because of the lack of a statement such as "We claim" before the claims.

Applicants have "respectfully decline[d]" to add these headings as these are not required under MPEP 608.01(a)

*Examiner's Response:*

The examiner respectfully disagrees with this reading of 608.01(a), whatever that reading may be. The examiner has read this section, and has come up with the opposite interpretation. Specifically, ¶ 6.02 "Content of the Specification" appears to expressly require that the specification contain the listed headings. Therefore, the objection to the specification is repeated.

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

**Arrangement of the Specification**

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

- (a) TITLE OF THE INVENTION.
- (b) CROSS-REFERENCE TO RELATED APPLICATIONS.
- (c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
- (d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT.
- (e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC.
- (f) BACKGROUND OF THE INVENTION.
  - (1) Field of the Invention.
  - (2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
- (g) BRIEF SUMMARY OF THE INVENTION.
- (h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).
- (i) DETAILED DESCRIPTION OF THE INVENTION.
- (j) CLAIM OR CLAIMS (commencing on a separate sheet).

- (k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
- (l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

### ***Claim Rejections - 35 USC § 101***

35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

The USPTO "Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility" (Official Gazette notice of 22 November 2005), Annex IV, reads as follows:

Descriptive material can be characterized as either "functional descriptive material" or "nonfunctional descriptive material." In this context, "functional descriptive material" consists of data structures and computer programs which impart functionality when employed as a computer component. (The definition of "data structure" is "a physical or logical relationship among data elements, designed to support specific data manipulation functions." The New IEEE Standard Dictionary of Electrical and Electronics Terms 308 (5th ed. 1993).) "Nonfunctional descriptive material" includes but is not limited to music, literary works and a compilation or mere arrangement of data.

When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized. Compare *In re Lowry*, 32 F.3d 1579, 1583-84, 32 USPQ2d 1031, 1035 (Fed. Cir. 1994) (claim to data structure stored on a computer readable medium that increases computer efficiency held statutory) and *Warmerdam*, 33 F.3d at 1360-61, 31 USPQ2d at 1759 (claim to computer having a specific data structure stored in memory held statutory product-by-process claim) with *Warmerdam*, 33 F.3d at 1361, 31 USPQ2d at 1760 (claim to a data structure per se held nonstatutory).

In contrast, a claimed computer-readable medium encoded with a computer program is a computer element which defines structural and functional interrelationships between the computer program and the rest of the computer which permit the computer program's functionality to be realized, and is thus statutory. See *Lowry*, 32 F.3d at 1583-84, 32 USPQ2d at 1035.

4. Claims 8 and 9 is/are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter as follows. Claim 8 defines "a computer program with instructions for processing..." embodying functional descriptive

material. However, the claim does not define a computer-readable medium or memory and is thus non-statutory for that reason (i.e., “When functional descriptive material is recorded on some computer-readable medium it becomes structurally and functionally interrelated to the medium and will be statutory in most cases since use of technology permits the function of the descriptive material to be realized” – Guidelines Annex IV). That is, the scope of the presently claimed “a computer program with instructions for processing ...” can range from paper on which the program is written, to a program simply contemplated and memorized by a person. The examiner suggests amending the claim to embody “a computer readable medium storing a program for” or equivalent in order to make the claim statutory. Any amendment to the claim should be commensurate with its corresponding disclosure.

Examiner acknowledges that Applicant agreed to amend the claim to overcome the 101 rejection by adding language defining that the program reside on a computer readable medium in a telephone interview on April 4<sup>th</sup> 2008. Applicant is advised to amend the claim as desired in the next response. After further examination, the reference to Pieper accurately reads on the amended claims and the claims are not found to be in condition for allowance.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

Art Unit: 2624

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 4 and 7-9 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,825,908 to Pieper et al.

With regard to claim 1, Pieper discloses a method of processing images, in which individual images succeed one another in a direction of succession (Figs. 3 and 13),

a multi-dimensional data set is constructed from the individual images (column 9, lines 1-10),

which multi-dimensional data set assigns data values to positions in a multi-dimensional space (column 9, lines 1-10),

which multi-dimensional space is set up by the direction of succession and two directions parallel to the surface of the individual images (Fig. 3 and column 9, lines 35-50),

a slice through the multi-dimensional data set is reconstructed along a cut plane through the multi-dimensional space (Fig. 13 and column 14, lines 19-35), and

the direction of the cut plane has a component in the direction of succession, and in which a region of interest is located on the basis of the cut plane (Fig. 13 and column 14, lines 27-35 and column 9, lines 38-42).



Applicant has amended claim 1 to include the following features taken from previously rejected claims 2 and 3: **segmenting a region of interest from the one or more relevant images is performed in one or more of the individual images, wherein the segmenting is performed on the basis of information in the reconstructed slice along the cut plane through the multi-dimensional data set (column 17, lines 15-35).**

**Locating an edge in the reconstructed slice, wherein the segmenting in the region of interest in the one or more images is performed on the basis of the location of the edge found in the relevant (image).**

Examiner disagrees and submits that Pieper does exactly what is claimed. The whole purpose of the invention of Pieper is to create reconstructed image slices in a direction different from the sampled image slices (column 14, lines 25-37). Pieper teaches that images are generated or reconstructed using data from slice images in a different direction through well known techniques known in the art. These techniques most likely use interpolation for recreating an image from a series of slice images. It is also a primary object of Pieper's invention to identify anatomical structures or regions of interest in both multiple interesting slices and in the 3D model image data (column 14, lines 56-67 and column 15, lines 22-63). Pieper teaches that markers are used in the image and the location of the marker is known in the other corresponding 2D slices and the 3D model image which are all simultaneously displayed to the user or physician. Furthermore when an object or anatomical structure or region of interest is identified in one 2D slice, it is identified in the other corresponding 2D slices, which have been

reconstructed or generated (column 15, lines 48-63). Therefore Pieper teaches a comprehensive system of 3D modeling with both sampled reconstructed 2D slices to identify regions of interest such as anatomical structures, markers, blood vessels or any other object. It should be noted that edges are inherently identified when the anatomical structure or object of interest is identified in the corresponding 2D slices. There can be no object of interest or anatomical structure without the known location of identified edges which define such a structure.

With regard to claim 4, Pieper discloses a method of processing images as claimed in claim 3, in which respective slices through the multi-dimensional data set are reconstructed along a plurality of cut planes through the multi-dimensional space, and the directions of the individual cut planes have components in the direction of succession individual edges are tracked in the individual slices, and the segmentation of the region of interest in the one or more images is performed on the basis of the individual locations of the respective edges found in the relevant image (Fig. 13 and column 14, lines 27-35 and column 9, lines 38-42).

With regard to claims 7, 8 and 9 the discussion of claim 1 applies.

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 5 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pieper in view of U.S. Patent 5,457,754 to Han et al.

With regard to Claim 5, Pieper discloses a method of processing images as claimed in claim 4. Pieper discloses the finding the boundaries of a region of interest and also discloses interpolation with respect finding a center-line thru use of interpolation but does not explicitly teach the use of interpolation for finding the edges between slice portions. However, it can be assumed that in order to create a 3D model as taught by Pieper that some interpolation will be needed to construct a model with smoothed contours of an organ or other region of interest for example. Han discloses a method for automatic contour extraction of a cardiac image in which:

- A boundary of the region of interest is derived by interpolation between the individual locations in the relevant image of the respective edges found (col. 16 lines 19-23). [Interpolation is used to create a continuous boundary as shown in Figures 28a, 28b, and 28c.]

It would be obvious to one skilled in the art to modify Pieper with the process of interpolation as taught by Han because Pieper stresses the importance of accurately determining the contours. Furthermore one would be motivated to make this

modification to improve the accuracy of the boundary because as Han explains noise and discontinuities negatively impact the determining of the boundary. Han explains how interpolation is used in medical imaging, specifically of the heart, to account for these factors.

With regard to claim 6, Han discloses a method for automatic contour extraction of a cardiac image in which:

The interpolation is performed inter alia on the basis of a priori information concerning the region of interest (23-26). [The a priori information is used to ensure the contours are not just continuous but meaningful as well.]

### ***FINAL REJECTION***

7. Applicant's amendment necessitated the grounds of rejection presented in the Office Action. Accordingly, THIS ACTION IS MADE FINAL. See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### **Contact Information**

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Wes Tucker whose telephone number is 571-272-7427. The examiner can normally be reached on 9AM-5PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt Bella can be reached on 571-272-7778. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Wes Tucker/  
Examiner, Art Unit 2624

/Matthew C Bella/  
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